NCPH North Carolina Public Health

Epi notes

Winter 2008

North Carolina Department of Health and Human Services | Division of Public Health | **www.epi.state.nc.us/epi**

Influenza Surveillance in North Carolina

Influenza is a major cause of illness and death in the United States and in North Carolina. Each year, seasonal influenza epidemics lead to approximately 36,000 deaths and 220,000 hospitalizations across the county. In 2004, more than 1,600 people died from complications of influenza in North Carolina. Influenza surveillance, coordinated through the Epidemiology Section, provides important information for tracking and combating seasonal influenza, as well as for detecting the emergence of potential pandemic strains. Flu surveillance allows public health officials to assess the burden of influenza on specific populations; to target interventions such as vaccination and public communications; and to identify changes in circulating strains of influenza virus.

To conduct influenza surveillance, the North Carolina Division of Public Health (N.C. DPH) works with partners from across the state to collect data from a variety of sources. Data from all of these sources are analyzed and compared to create a timely and accurate picture of influenza activity in the state. The major components of influenza surveillance are described below.

Outpatient Influenza-like Illness Surveillance Network

In a joint effort with the State Laboratory of Public Health (SLPH), the Communicable Disease Branch participates in CDC's Outpatient Influenza-like Illness (ILI) Surveillance Network (ILINet), formerly known as the Sentinel Provider Surveillance Network. Through this program, volunteer providers from across the state report the following information to CDC on a weekly basis:

- Total number of patient visits, and
- Number of patient visits for ILI (defined as fever of at least 100°F along with cough or sore throat), broken down by age group.

These data are compared to national and region-specific baselines, providing an important tool for monitoring influenza activity in North Carolina, and also for supporting CDC influenza surveillance throughout the U.S.

This is the ninth consecutive year that N.C. DPH has participated in the ILINet program. Based on statewide population, CDC's goal for North Carolina is to have 36 sentinel sites. During the 2007–2008 season, 78 health providers throughout the state regularly reported ILI to CDC. This season, 79 providers in 49 counties have agreed to report, including a record-high number of local health departments. The current ILINet surveillance season began on September 28, 2008 and will conclude on May 23, 2009. Providers interested in becoming part of this network can contact Torrey McLean, Influenza Surveillance Coordinator, at 919-733-1193 or Torrey.Mclean@ncmail.net.

Virologic Surveillance

In addition to reporting ILI data, ILINet providers collect samples from selected patients with ILI and submit them to SLPH for viral testing and strain identification. The laboratory also receives surveillance specimens for influenza testing from other sources across the state. These specimens are critical for helping public health officials determine when influenza begins affecting the state's population, whether circulating strains are a good match to the current year's vaccine, whether changes are needed for the following year, and whether changes are occurring in antiviral resistance.

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Moreover, this process allows for timely recognition of new influenza strains that could have the potential to cause an influenza pandemic.

Emergency Department Syndromic Surveillance

Real-time syndromic surveillance for ILI is conducted through the North Carolina Disease Event Tracking and Epidemiologic Collection Tool (N.C. DETECT). N.C. DETECT was created in 2003 to address the need for early event detection and timely public health surveillance in North Carolina. The system uses a variety of data sources, including emergency departments (EDs), the Carolinas Poison Center, and the Pre-hospital Medical Information System (emergency medical services data). N.C. DETECT is currently receiving data daily from 114 of the 116 24/7 EDs in North Carolina (including Veteran's Administration facilities). For the purposes of biosurveillance, ED visits are grouped into syndromes based on analyses of the chief complaint, initial ED temperature, and history of the present illness (when available). The N.C. DETECT ILI syndrome case definition includes any case with the term "flu" or "influenza", or at least one fever term and one influenza-related symptom. Because these data are submitted and updated twice a day, they are particularly useful for real-time monitoring and for early detection of outbreaks. N.C. DETECT provides influenza surveillance data up to two weeks earlier than the traditional, manually tabulated data from ILINet.

The proportion of ED visits meeting the ILI syndrome definition is monitored throughout the year and compared to data obtained from ILINet. In past years, data from the two systems have shown similar trends (Figure 1). The higher proportion of ILI seen in N.C. DETECT compared to ILINet reflects differences in the case definitions and patient populations rather than a difference in the sensitivity of these surveillance systems.

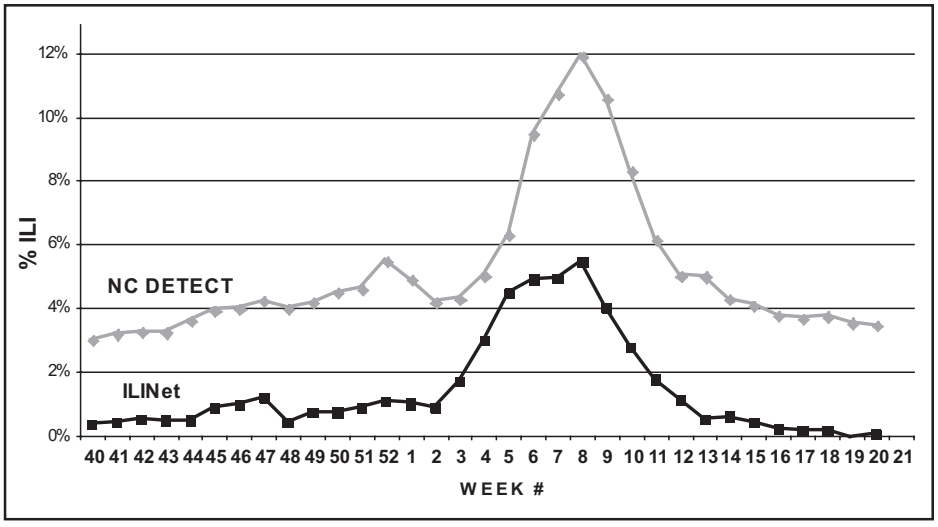
Respiratory Viral Pathogen Surveillance

During influenza season (October–May) the N.C. Division of Public Health collects information about laboratory tests for selected viral pathogens through the Public Health Epidemiologist (PHE) program. PHEs are located in the state's 11 largest healthcare systems, where they serve as liaisons between clinicians and public health officials and conduct surveillance for a variety of conditions. For this laboratory-based surveillance, PHEs report the number positive tests each week for influenza, respiratory syncytial virus (RSV), adenovirus, parainfluenza 1–3, and rhinovirus. Since many of these viruses can cause similar illnesses, these data help public health officials determine whether increases in ILI are due to influenza or other causes. For example, the data shown in figure 2 suggest that increases in ILI during the early part of the 2007–2008 flu season were likely due in part to RSV, while larger increases later in the season were more likely due to influenza.

Other Surveillance Methods

In addition to the systems described above, local health departments are required to investigate and report all pediatric influenza-associated deaths and novel influenza virus infections – i.e., infections with any

Figure 1: Proportion of Emergency Department and Outpatient Visits due to Influenza-like Illness in North Carolina during the 2007–2008 Influenza Season: Comparison of Two Surveillance Systems



ILINet: Volunteer outpatient medical providers reporting weekly. ILI case definition: "Fever and cough or sore throat."

N.C. DETECT: Electronic syndromic surveillance using twice daily reporting from >98% of N.C. emergency departments. ILI case definition: "Any case with the term 'flu' or 'influenza' or at least one fever term and one influenza-related symptom."

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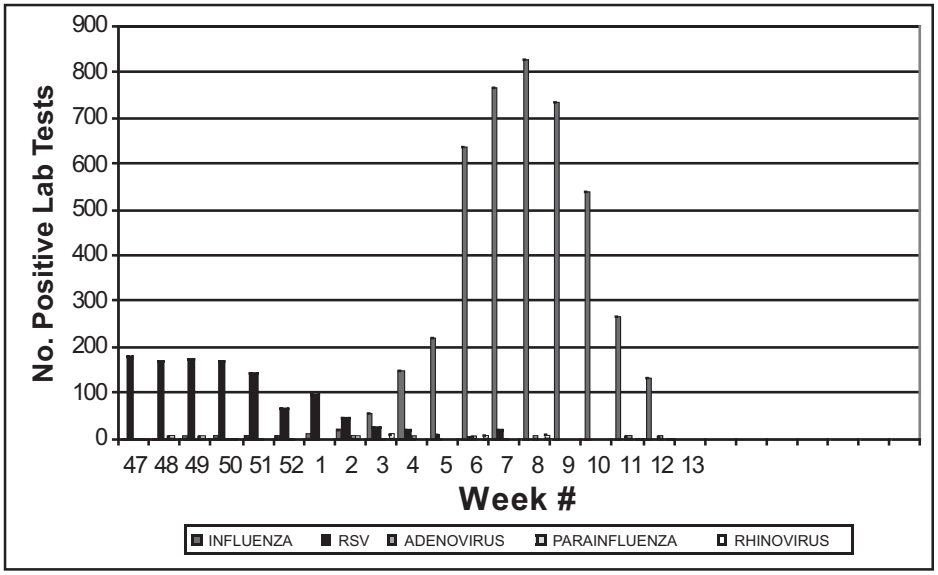
influenza virus that is different from currently circulating human strains. N.C. DPH also assists local health departments in investigating influenza outbreaks in schools, long-term care facilities, and other settings. North Carolina contributes to national pneumonia and influenza mortality surveillance through the 122 Cities Mortality Reporting System, with Charlotte being one of the reporting cities. Finally, PHEs routinely conduct active surveillance for hospital admissions due to community-acquired pneumonia (CAP), and investigate clusters of CAP with special attention to recent travel history. During the 2008-2009 season, CAP surveillance is being modified and data compared to other surveillance sources to determine whether this system can provide useful information about influenza morbidity in the state.

Figure 2: Number of Positive Tests for Selected Respiratory Viral Pathogens at PHE Facilities by Week, 2007-2008 Influenza Season



Influenza Surveillance and Pandemic Influenza

Each of these surveillance components improves our ability to detect the potential emergence of an influenza pandemic. N.C. DPH has also developed a clinical algorithm for detection and management of avian influenza H5N1. In the event of a pandemic, changes to routine surveillance systems will be required. Detailed plans for adapting influenza surveillance during a pandemic are available at **www.ncpanflu.gov**.

Submitted by:
Zack S. Moore, MD, MPH, Respiratory Disease Epidemiologist, Communicable Disease Branch

State Laboratory of Public Health Chemical Terrorism Unit Receives its First Clinical Sample

Background

The Chemical Terrorism (CT) Unit at the N.C. State Laboratory of Public Health (NCSLPH) is a state-of-the-art analysis laboratory with two GC/MS (gas chromatograph/mass spectrometer) instruments, two ICP/MS (inductively coupled plasma/mass spectrometers), and a LC/MS/MS (liquid chromatograph/tandem mass spectrometer). The CT Unit can analyze blood and urine samples by various methods for target agents such as cyanide, nerve agent metabolites, toxic metals, metabolic toxins and volatile organic compounds. The CT Unit has been qualified to detect mercury (Hg), lead (Pb) and cadmium (Cd) in blood by ICP/MS methodology since October 2006. Certification was awarded after a method validation and a CDC proficiency challenge were successfully completed. The CT Unit received its first clinical sample on Friday, Oct. 24, 2008 – a request from Central Carolina Medical Center in Sanford, N.C., for analysis of a clinical sample for exposure to mercury.

Situation

A pregnant worker had been exposed to mercury vapors for a period of about one hour due to a broken thermometer in an incubator while she was working in the area. Upon confirmation that a blood sample was being brought to the lab as soon as possible, the CT laboratory began preparations for the analysis. The sample arrived at approximately 12:55 PM, analysis

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was performed, and results were reported verbally to the submitter at 2:15 PM. A hardcopy of the report was also provided by secure fax to the submitter. The rapid response was due largely to a new autosampler, which not only enabled sample time to be reduced by half but also reduced the effects of potential cross-contamination. The patient's test result was 12.5 ug/L of mercury. A consultation with subject matter experts at CDC provided a National Health and Nutrition Examination Survey (NHANES) confidence interval range for blood mercury levels at the 95th percentile for females 16-49 years old of 3.7-5.9 ug/L. This indicates that 95 percent of the time, values observed within this range are considered normal. No further feedback was received from Central Carolina Medical Center and a repeat analysis was not requested for this patient.

Summary

The communication, transport, testing and reporting of results for this sample went very well. As with any situation, improvements can be made for the next event. For example, the patient samples arrived packed in wet ice, but the recommendation is to use ice packs instead of wet ice for shipment. It was also necessary to ensure the submitter completed the NCSLPH requisition form and labeled the patient sample properly to ensure compliance with laboratory policies. It was difficult to interpret the meaning of the elevated mercury level for this patient, since a baseline level was unknown and follow-up samples were not collected. Perhaps a more in-depth investigation of the environment would have helped identify any other workers potentially at risk. This sample demonstrates how the methodology intended for a terrorist attack can also be utilized in everyday situations to benefit the citizens of North Carolina.

Submitted by:
Kaye Flood, Chemical Terrorism Coordinator, NCSLPH

Communication an important part of HACE Program

The Health Assessment, Consultation and Education Program (HACE) is part of the N.C. Division of Public Health's Occupational and Environmental Epidemiology Branch. The program's mission is to determine public health impacts associated with exposures to toxic substances released into the environment in North Carolina. The program usually gets involved with hazardous waste sites, but also with chemical exposures associated with contaminated fish, groundwater, soil or sediments, among others. Usually a request or petition for an evaluation comes from local, state and/or federal agencies or concerned citizens. The HACE team then conducts an evaluation to determine if exposure to a hazardous substance is occurring and what the health impact may be.

The program receives funding through a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR, a federal public health agency) and the N.C. Division of Public Health. HACE has a team of specialists who conduct health assessments and consultations throughout the state. The team includes a program coordinator (Sandy Mort), a health assessor (John Masters), and a community health educator (Mercedes Hernández-Pelletier).

Community involvement and education is an integral component of the HACE program. The community health educator works with the rest of the team to incorporate principles of health education and risk communication into their everyday activities so they can effectively communicate with various interested parties about the nature and level of risks and the controls that can be implemented to change potential risks.

Risk communication activities can help program staff:

- Understand the community's risk perception and more easily predict community response to agency actions.
- Improve dialogue and reduce unwarranted decisions by involving concerned communities.
- Explain health risk information more effectively to communities.

Merely disseminating information without regard for communicating the complexities of risk does not guarantee effective risk communication. A well-managed effort will help ensure that the messages are constructively formulated, transmitted and received, and that they result in meaningful actions. The health education activities include community assessments, keeping involved parties informed of the progress of the

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investigations, developing communication materials for different audiences (such as fact sheets, website updates, posters and signs), and monitoring the effectiveness of communication efforts at each site.

Mercedes Hernández-Pelletier joined the HACE team in September 2008. Prior to joining HACE, she was executive director of the N.C. Farmworkers Project, Inc., a farmworker advocacy organization in Johnston County. She has more than 12 years of experience in health education in community health centers and grassroots settings, primarily working with hard-to-reach populations. Specifically, she was involved in developing and implementing health education programs for Latinos, African Americans and farmworkers around issues of sexually transmitted infections and pesticide exposure. She holds a BA in Psychology and Communication and an MPH in Health Education and Health Policy and Management, both from the University of Massachusetts, Amherst.

Submitted by:
Mercedes Hernandez-Pelletier, Health Educator-Health Assessment Consultation & Education Program

Twinning Project: North Carolina State Laboratory of Public Health and National Public Health Reference Laboratory, Georgetown, Guyana

In May 2008, the Centers for Disease Control and Prevention (CDC) contacted laboratory director Dr. Leslie Wolf to request assistance from the N.C. State Laboratory of Public Health (NCSLPH) in the development of the newly constructed Guyana National Public Health Reference Laboratory (NPHRL). The Association of Public Health Laboratories (APHL) coordinated the funding from the CDC to facilitate this work, supported by the President's Emergency Plan for AIDS Relief (PEPFAR).


Laboratory visit, New Amsterdam Hospital, Guyana

In addition to touring the NPHRL, the assessment team visited Eureka Laboratory, a private laboratory in Georgetown, the Central Medical Laboratory supporting Guyana's tertiary care hospital in Georgetown, plus two regional hospital laboratories located in New Amsterdam and West Demerara. These facilities represented the spectrum of diagnostic services available in the country. The new NPHRL will maintain quality oversight for all but the private laboratories.

Dr. Leslie Wolf and Royden Saah, bioterrorism and emerging pathogens coordinator of the NCSLPH, and Tony Tran, global health program manager, APHL, arrived in Georgetown on Nov. 16. The next day, they began the initial assessment of Guyana's NPHRL, inspecting the facility and meeting the staff. Courtesy visits with the chief medical officer in the Ministry of Health, Dr. Shamdeo Persaud, and with the CDC country director, Dr. La Mar Hasbroek, allowed the team to hear the vision each had for the future of the NPHRL. The visiting team was hosted by Dr. Colin Roach, NPHRL laboratory director, and Dr. Gayathri Warnasuriya, CDC senior technical laboratory advisor in Guyana. The assessment included a full tour of the new facility, which currently conducts rapid HIV testing as well as CD4 testing. The Ministry of Health intends to bring clinical chemistry, microbiology, and molecular diagnostic testing on-line over the course of this project.

After making an initial assessment, the visiting team and hosts created a preliminary scope of work focusing on five areas: mentoring, quality assurance, biosafety, technical assistance for implementing new methods, and development of a national laboratory system. While much work can be done electronically using the document management and sharing tool Sharepoint, it is anticipated that Dr. Colin Roach and other staff will visit North Carolina for a week of training. In addition, NCSLPH staff may conduct on-site trainings in Georgetown to maximize the number of NPHRL staff that can be trained. Because of the expertise of staff within the NCSLPH, there is much optimism for all stakeholders that this twinning initiative will be a successful long-term partnership.

Submitted by:
Royden Saah, MS, BTEP Coordinator, NCSLPH
Leslie A. Wolf, PhD, Laboratory Director, NCSLPH

The Career Epidemiology Field Officer program:
Bridging local, state and federal epidemiology

Following the terrorist and anthrax attacks in 2001, U.S. Health and Human Services Secretary Tommy Thompson directed the Centers for Disease Control and Prevention (CDC) to assign an Epidemic Intelligence Service (EIS) officer or graduate to every state. In response, the CDC created the Career Epidemiology Field Officer (CEFO) Program in early 2002, which has since comprised a national cadre of EIS-trained CEFOs who work with states and large local health departments to develop epidemiologic and emergency response capacities.

The objectives of the CEFO Program include:

- providing epidemiologic expertise to state terrorism and emergency response planning and policy;
- providing leadership, training, and technical support for maintaining and building local epidemiologic capacity;
- building partnerships with state and local agencies with responsibility for preparedness and response activities; and
- recruiting and supervising new epidemiologists, including EIS Officers.

Since 2002, three CEFOs have served in the N.C. Division of Public Health. Dr. Megan Davies completed her EIS assignment in Louisiana in 2000 and served in the Injury Center at CDC before becoming North Carolina's first CEFO. During her tenure, Megan focused on enhancing infectious disease surveillance capacity within the state. She was instrumental in establishing the Public Health Epidemiologist Program that includes 12 hospital-based epidemiologists who serve as surveillance sentinels while building relationships between the clinical and public health communities. In addition, Megan assisted in the development of NC DETECT (North Carolina Disease Event Tracking and Epidemiologic Collection Tool) – a national model for near real-time, statewide enhanced surveillance. Megan left the CEFO program in 2007.

Brant Goode became the state's second CEFO after completing his EIS training in North Carolina in 2006. Brant quickly assumed leadership roles in pandemic influenza preparedness and response planning and training. He assisted in the development of a nationwide public health training program for responding to highly pathogenic avian influenza outbreaks and pandemic influenza. Following Brant's departure in 2008, North Carolina received its third and current CEFO, Dr. Aaron Fleischauer, in August.

Aaron has served as a CDC epidemiologist since 2002 when he entered the Bioterrorism Preparedness and Response Program's EIS program. Like Megan, Aaron will focus on continuing to strengthen the state's surveillance capability. Additionally, he will focus on establishing a comprehensive disaster epidemiology program to enhance and integrate local and state epidemiologic resources. The program will address preparedness and response needs such as:

- community needs assessments,
- surveillance,
- response team planning and training, and
- developing a situation awareness tool to enhance the sharing of epidemiologic information to and from local health departments during a disaster.

Megan's, Brant's and Aaron's experience serving our state echoes the sentiment shared by CEFOs nationwide – "When local public health is strong, the nation's public health system is strong." For six years, the CEFO program has worked to build all-hazards epidemiologic capability within North Carolina while continuing to strengthen the relationship between local and state health public health and the federal government.

Submitted by:
Aaron Fleischauer, PhD
CDC Career Epidemiology Field Officer

Reported Communicable Diseases, North Carolina, January-December 2008
(by date of report)*

Disease	Year-to-Date (Fourth Quarter)			4th Quarter 2008	Comments / Note
	2008	2007	Mean (2003-2007)		
Botulism, Infant	1	1	0	0	
Brucellosis	1	6	2	0	
Campylobacter	614	629	713	230	
Chlamydia, laboratory reports	37,499	30,613	30,096	10,985	
Creutzfeldt-Jakob Disease	5	5	2	1	
Cryptosporidiosis	79	132	92	50	
Cyclosporiasis	1	4	2	1	
Dengue	7	11	8	2	
E. coli Shiga Toxin-producing	142	153	108	71	
Ehrlichiosis, Granulocytic	2	4	4	2	
Ehrlichiosis, Monocytic	35	53	40	9	
Ehrlichiosis, Other	4	3	2	3	
Encephalitis, California Group	8	10	20	1	
Encephalitis, Arboviral, other	2	1	0	0	
Encephalitis, West Nile	1	4	6	0	
Foodborne, C. Perfringens	3	3	4	0	
Foodborne, Other	13	64	303	1	
Gonorrhea	14,618	16,666	15,866	4,234	
Haemophilus Influenzae	81	59	59	21	
Hepatitis A	63	66	97	11	
Hepatitis B	83	128	160	21	
Hepatitis B Carrier	499	898	870	137	
Hepatitis B Perinatal	1	1	3	0	
Hepatitis C, Acute	46	17	16	9	
HIV/AIDS	2,650	2,237	1,948	945	
Hemolytic Uremic Syndrome	7	12	8	4	Note 1
Influenza Pediatric Mortality	1	1	1	0	
Legionellosis	38	53	43	14	
Leptospiosis	1	1	1	0	
Listeriosis	26	33	27	12	
Lyme Disease	59	53	82	30	
Malaria	31	22	28	8	
Menincoccal Invasive Disease	18	22	32	6	
Meninigitis, Pneumococcal	34	44	35	4	
Mumps	6	28	18	1	
Q Fever	3	4	4	1	
Rabies in animals	454	472	561	92	
RMSF	515	665	602	202	
Salmonellosis	1,569	1,844	1,667	660	
Shigellosis	275	105	405	128	

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Disease	Year-to-Date (Fourth Quarter)			4th Quarter 2008	Comments / Note
	2008	2007	Mean (2003-2007)		
Strep A, invasive disease	136	167	138	19	
Syphilis, Total	509	569	502	150	Note 2
Toxic Shock Synd.,Strep	6	7	7	1	
Tuberculosis	334	345	361	103	
Tularemia	3	1	1	1	
Typhoid, Acute	6	8	7	1	
V Vulnificus	4	3	5	1	
Vibrio, Other	9	17	14	5	
VISA/VRSA (Staph aureus)	3	0	0	1	
Whooping Cough	94	330	207	15	

* Preliminary data, as of 2/3/2009. Quarters defined as 13-week periods. Diseases reported in 2008 define those listed in this table.
Notes: 1. Earliest report with HIV infection or AIDS diagnosis; 2. Includes primary, secondary and early latent syphilis.

Epidemiology Section Employee Recognition
Winter 2008

Michael Hilton

Michael Hilton, a Public Health Program Consultant II, has worked with the HIV /STD programs in the Communicable Disease Branch for the last seventeen years. Michael's background as a Centers for Disease Control and Prevention Public Health Advisor stationed in Chicago, Illinois, prepared him to take a leadership role with the Black Mountain Field Service Office in 1992. Michael's direct knowledge of integrated field investigation, outbreak response partner notification, and surveillance activities has enabled the Branch to use his skills to train new field staff, analyze disease trends, determine appropriate interventions, and build integrated data management systems that assure rapid investigation of disease outbreaks.

Michael has acted as one of the Branch's regional representatives to CDC regarding projects such as Chlamydia Infertility Prevention and the STD MIS (Sexually Transmitted Disease Management Information System) which is a unique, CDC-developed program to assist in managing state partner notification activities. Michael also has worked with other key staff in the Branch's HIV/AIDS Care Unit to launch the Ryan White Title II CAREWare data system, which required him in the early days to spend many hours with HRSA staff to learn the system and integrate it into the state's surveillance programs. This database is absolutely essential to the federal Ryan White reporting system and was required as a condition of the grant award that North Carolina uses to provide care and treatment services to people living with HIV/AIDS. Michael's support involves interaction/coordination with other key Branch staff and thirty sub-recipient agencies located in multiple counties across the state and funded by the Branch and HRSA. Due to the successful launch of this program, the Branch is able to track services provided to people living with HIV/AIDS, analyze gaps, and work with community-based programs toward needed improvements.

Michael is also a technical liaison for the North Carolina Electronic Disease Surveillance System (NC EDSS).

Michael Hilton, center, receives a certificate of appreciation from Evelyn Foust, Communicable Disease Branch head, and Dr. Jeffrey Engel, State Epidemiologist and head of the N.C. Epidemiology Section.

Michael serves as the N.C. Communicable Disease Branch representative to the development of the STD PAM, providing programmatic input into the Business Process Management Model utilized by the CDC and assuring that North Carolina's needs are represented.

Recently, the Communicable Disease Branch undertook a major move that required the TB Program to move from the central Cooper Building location to the regional Front Street location, while the Public Health Veterinarian program moved into the Cooper Building from another location. Michael, working on nights and weekends, volunteered to manage multiple work orders to assure communication transitions and installations; helped staff physically carry boxes, furniture, and computers from one location to another; and helped staff get reconnected . During the move, many staff reported that Michael kept a smile on his face, never complained and as always asked "What can I do to help you?"

Michael Hilton is valued in the Communicable Disease Branch for his many skills, talents and historical understanding of the importance of integrated communicable disease programs. Within the last 17 years, there is no doubt that our ability to better respond to new cases of HIV and STD has been because Michael has been a key member of an outstanding surveillance and disease intervention team. He is also highly respected and appreciated for his smile and his willingness to help his co-workers and the community we serve daily.

Submitted by:
Evelyn Foust, Branch Head
for Communicable Disease Branch

Dr. Jeffrey Engel, State Epidemiologist

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Epidemiology Section Office	(919) 733-3421
Communicable Disease Branch	(919) 733-3419
HIV/STD Program	(919) 733-7301
Occupational and Environmental Epidemiology Branch	(919) 707-5900
State Laboratory of Public Health	(919) 733-7834
Office of the State Medical Examiner	(919) 966-2253
Public Health Preparedness and Response	(919) 715-0919
Public Health Preparedness and Response Emergency Number 365/7	**(888) 820-0520**
Rabies Emergency Number Nights, Weekends, Holidays	**(919) 733-3419**
Emergency Number Nights, Weekends, Holidays	**(919) 733-3419**

State of North Carolina
Division of Public Health
Epidemiology Section
1902 Mail Service Center
Raleigh, NC 27699-1902